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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,277	11/02/2001	Peter Hsiuen Wu	38190/201827	3510

826 7590 01/30/2004

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EXAMINER	
RUGGLES, JOHN S	

ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/016,277	WU, PETER HSIUEN
	Examiner	Art Unit
	John Ruggles	1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Applicant's response filed 17 December 2003 has amended claim 28 and cancelled previously withdrawn claims 50-63. Therefore, only claims 1-49 are now pending and remain under consideration.

Drawings

The corrected drawings of Figures 1 and 2 were received in clean form (non-facsimile) on 17 December 2003. They are now accepted and the previous objections are withdrawn.

Claim Rejections - 35 USC § 112

The previous rejection under the second paragraph of 35 U.S.C. 112 has been overcome by the amendment to claim 28 and is now withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-15 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda, et al. (US Patent 5,466,739) in view of Sokol (US Patent 5,773,487) further in view of Lake (US Patent 5,571,570), and further in view of Wright (US Patent 5,260,350).

Maeda teaches a peelable radiation curable maskant composition optionally including a polymerizable acrylate with talc or silica filler (instant claims 7-8) and a process of chemically milling a metal aircraft part using the maskant (column 1, lines 10-21, column 3, lines 51-60, and column 5, lines 48-51). Note that the polymerizable acrylate is understood to include diacrylate, urethane acrylate and/or urethane diacrylate (instant claim 4). At column 1, lines 33-34 and column 7, lines 28-31, the metal of the part is described as aluminum (Al), iron (Fe), titanium (Ti), and/or the like, which is understood to include alloys thereof (instant claim 2). The process of chemically milling the metal part involves: (1) coating the maskant onto the metal by spraying, rolling, or immersion (instant claim 15); (2) drying or curing the coating by far infrared rays; (3) scribing the maskant to allow peeling away of unneeded maskant portions; and (4) etching through the maskant for chemically milling selected portions of the metal substrate, optionally in plural separate stages of scribing additional portions of the maskant for removal and further etching through the maskant (column 7, line 33 to column 8, line 12, instant claims 1 and 17-18). The cured maskant film thickness is 100-800 μm, which correlates to 4-31 mils (column 7, lines 25-27, fully encompassing the 5-20 mils of instant claim 13). After etching, the peeling strength of 1 inch wide strips of maskant giving "good" results were measured in the range of 200-1,200 g/inch as shown in Table 2 (columns 11-12), which correlates to a peeling strength of 7-42 oz./inch (instant claim 14).

While teaching the use of a radiation polymerizable monomer in the category of acrylates for the maskant, Maeda does not specifically teach (1) curing with actinic radiation using a photoinitiator in the peelable radiation curable maskant composition including a polymerizable acrylate; (2) using at least one of the specific monomers of instant claim 5 in the peelable

radiation curable maskant including a polymerizable acrylate; (3) using at least one of the specific photoinitiators of instant claim 6 in the peelable radiation curable maskant including a polymerizable acrylate; and/or (4) radiation curing of the acrylate coating at a rate of about 1-10 feet/minute.

However, combinations of these acrylate monomers and photoinitiators (instant claim 3) are known for substantially solvent free radiation curable acrylate coatings as shown by Sokol at column 3, line 44 to column 4, line 29 (instant claims 5-6). These coating combinations provide quick curing upon exposure to ultraviolet (UV) light, sunlight, or electron beams (column 2, lines 41-44, instant claim 9). In column 6, lines 1-8, UV light (e.g., having a peak spectral wavelength in the range of 180 nm to 420 nm, etc., which reads on instant claims 11, 28, and 39 for a UV radiation wavelength of about 200 nm to about 450 nm) can be generated using typical factory lighting, which is considered to include movable light sources (instant claim 10).

Furthermore, while Maeda and Sokol show actinic UV curing of a radiation polymerizable acrylate composition to form a peelable maskant using a UV radiation wavelength of about 180 nm to 420 nm, they do not specifically teach that the UV radiation source has an intensity of about 100 W/cm^2 to 600 W/cm^2. However, UV curing of a polymerizable acrylate coating composition at a wavelength in the range of 1800-4500 Å (180-450 nm) is known to be carried out with a high pressure mercury lamp as a UV radiation source having an intensity of 30-400 W/cm^2, as shown by Lake at column 5, lines 48-56 in view of Example 2 at column 6, line 53 (which fully encompasses the UV radiation source intensity of 120-185 W/cm^2 found in instant claim 11). UV curing of a polymerizable acrylate coating composition using this radiation source provides good through cure, which is achievable over a surprisingly wide range

of exposures, in order to ensure desirable crack resistance and provide a coating having uniquely combined properties of durability, scratch resistance, and flexibility (column 5, line 62 to column 6, line 8).

UV curing of an acrylate coating on a substrate moving relative to a UV radiation source at a specified rate in feet/minute in the range of 1-10 feet/minute is also known. Wright describes UV exposure curing of an acrylate coating moving past a medium pressure mercury vapor arc lamp at a line speed of 3 feet/minute for a UV curing exposure average intensity of 91.56 mW/cm^2 at column 11, lines 5-9 (which reads on a rate of 1-10 feet/minute recited in instant claim 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute any of the substantially solvent free radiation curable acrylate coating compositions (having a photoinitiator for curing by actinic or UV radiation) of Sokol for the radiation curable maskant including polymerizable acrylate in the process of Maeda with the lighting for curing as shown by Sokol in order to obtain quick curing of the polymerizable acrylate maskant. It would also have been obvious to have carried out the curing of the UV radiation polymerizable acrylate composition to form a peelable maskant, as shown by Maeda and Sokol, by using a UV radiation source having a wavelength of 180-450 nm and an intensity of 30-400 W/cm^2, as shown by Lake, for curing of an acrylate coating composition while relatively moving the acrylate coating past a UV radiation source at a line speed of 3 feet/minute, as described by Wright. This is because UV curing of a polymerizable acrylate coating composition using Lake's radiation source provides good through cure, which is achievable over a surprisingly wide range of exposures, in order to ensure desirable crack resistance and provide

a coating having uniquely combined properties of durability, scratch resistance, and flexibility; and further because Maeda, Sokol, and Wright all relate to the same art of radiation curing of an acrylate coating composition.

Claims 16, 19-21, 26, 28-32, 35, 39, 40-42, and 43-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda and Sokol in view of Lake, further in view of either Blake (US Patent 5,126,005) or Jaffe, et al. (US Patent 4,585,519), and further in view of Wright.

While teaching actinic UV curing of a radiation polymerizable acrylate composition using a UV radiation wavelength of about 180 nm to 420 nm to form a peelable maskant to a thickness of 4-31 mils (having a peeling strength of 7-42 oz./inch for a 1-inch wide strip) and chemical treatment of an Al, steel, or Ti metal aircraft part, Maeda and Sokol do not specifically teach (1) curing of the acrylate composition by a UV radiation source having a wavelength of 180-450 nm and an intensity of about 100 W/cm^2 to 600 W/cm^2, (2) masking both sides of the metal aircraft part, (3) subsequently resealing scribed cut lines of the mask before chemically milling, and (4) radiation curing of the acrylate coating at a rate of about 1-10 feet/minute.

The showing of Lake is discussed above.

Blake shows coating both sides of a metal aircraft part with maskant layers and overcoating with a plastic film, selective removal of portions of the plastic and maskant layers, and subsequent chemical milling and anodizing of the metal part (column 3, line 7 to column 4, line 13).

Jaffe describes a process of chemically milling a metal aircraft part by masking the metal part (column 5, lines 50-53), scribing the mask with a pattern, marking the scribed cuts, resealing the scribed lines (column 9, lines 36-40), removing (e.g., by peeling, etc.) the scribed portions of the mask, and etching (optionally in separate steps of scribing and etching different portions of the metal part, column 9, lines 58-60). All surfaces of the metal part should be masked except those areas to be chemically milled (column 11, lines 19-24). The sealant may be the same material as that of the mask or any other sealant material, which is both compatible with the mask and capable of withstanding the etching step(s) (column 12, lines 30-33). Also, the sealant may be applied with a roller, brush, or other fluid dispenser as may be desired, depending on the flow characteristics of the sealant material (column 12, lines 33-37).

The description of Wright is discussed above.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to perform curing of the UV radiation polymerizable acrylate composition to form a peelable maskant, as shown by Maeda and Sokol, by using a UV radiation source having a wavelength of 180-450 nm and an intensity of 30-400 W/cm^2, as shown by Lake, and radiation curing at a rate of 3 feet/minute (which reads on the about 1-10 feet/minute of instant claim 40) for curing of an acrylate coating composition, as described by Wright. This is because UV curing of a polymerizable acrylate coating composition using Lake's radiation source provides good through cure, which is achievable over a surprisingly wide range of exposures, in order to ensure desirable crack resistance and provide a coating having uniquely combined properties of durability, scratch resistance, and flexibility. It would also have been obvious to combine the masking (having a peeling strength of 7-42 oz./inch for a 1-inch wide strip, instant claim 42) and

chemical treatment (milling) taught by Maeda and Sokol with the double-sided masking and chemical treatment either shown by Blake (further coating of mask, then scribing, milling, and anodizing) or described by Jaffe (resealing scribed lines and milling). It would further have been obvious to apply the sealant material (e.g., by rolling, etc.) as described by Jaffe. This is because: (1) Maeda, Sokol, Lake, and Wright all relate to the same art of radiation curing for polymerizable acrylate compositions and (2) Maeda, Blake, and Jaffe all relate to the same art of masking and chemical treatment of a metal aircraft part.

Claims 22-23, 27, 33-34, 37-38 and 48-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of either Blake or Jaffe, and further in view of Sokol.

While teaching the use of a radiation polymerizable monomer in the category of acrylates for the maskant and/or sealant, Maeda and either Blake or Jaffe do not teach (1) at least one of the specific monomers of instant claims 22 and 33, (2) at least one of the specific photoinitiators of instant claims 23 and 34, and (3) curing the line sealant by UV, black light, or visible radiation.

However, combinations of these acrylate monomers and photoinitiators are known for radiation curable acrylate coatings, which are quickly cured by exposure to UV light or sunlight as shown by Sokol and discussed above.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute any of the radiation curable acrylate coating compositions, which are cured by UV light or sunlight as shown by Sokol for the maskant (having a peeling strength of 7-42 oz./inch for a 1-inch wide strip, instant claims 48-49) and/or sealant in the process of Maeda

and either Blake or Jaffe in order to obtain quick curing of the polymerizable acrylate maskant and/or sealant as shown by Sokol.

Claims 24-25 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of either Blake or Jaffe, further in view of Sokol, and further in view of Snowwhite, et al. (US Patent 6,136,880).

While teaching use of radiation polymerizable acrylate and photoinitiator combinations for the maskant and/or sealant, Maeda, either Blake or Jaffe, and Sokol do not teach the addition of a wax and a triethanolamine synergist.

Snowwhite discloses radiation curable and removable protective coating compositions having many of the same acrylate monomer(s) and/or photoinitiator(s) as shown by Sokol and discussed above along with additives of wax to exclude oxygen (O_2) and at least one accelerator or synergist including triethanolamine, which also helps to overcome the inhibiting effect of O_2 (column 16, line 58 to column 17, line 11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute any of the radiation curable acrylate coating compositions of Sokol along with the additives of wax and triethanolamine synergist as disclosed by Snowwhite for the maskant and/or sealant in the process of Maeda and either Blake or Jaffe in order to obtain quick curing of the polymerizable acrylate maskant and/or sealant as taught by Sokol and also to overcome the inhibiting effect of O_2 as disclosed by Snowwhite.

Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda and Sokol in view of either Blake or Jaffe, and further in view of Gnanamuthu, et al. (US Patent 4,716,270).

While teaching masking, mechanically scribing (e.g., with a knife, etc.), subsequent coating or sealing, peeling away cutout maskant, and chemical treatment, Maeda and Sokol and either Blake or Jaffe do not teach performing the scribing step alternatively with a laser.

Gnanamuthu teaches masking of a metal aerospace part, scribing a pattern in the maskant, peeling away cutout portions of the maskant, repairing cut edges of the maskant by resealing to the metal (e.g., tacking the maskant back down to the metal by solvent wetting, etc.), chemically milling the metal through the maskant pattern, and removing remaining maskant (column 1, lines 28-58). The maskant scribing is alternatively performed with a laser (column 4, lines 3-4). Laser scribing of the maskant reduces labor costs, avoids scoring of the metal underlying the maskant, and does not adversely affect the adhesion of the remaining maskant so that there is no premature lift-off or peel-back of the remaining maskant before chemical milling (column 2, lines 35-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute laser scribing as taught by Gnanamuthu for the mechanical scribing of the maskant as taught by Maeda and Sokol and either Blake or Jaffe, because (1) Maeda and Sokol both relate to the same art of radiation curing for polymerizable acrylate compositions and (2) Maeda, Blake, and Jaffe all relate to the same art of masking and chemically milling a metal aircraft or aerospace part. In addition, laser scribing of the maskant reduces labor costs, avoids scoring of the metal underlying the maskant, and does not adversely affect the adhesion of the

remaining maskant so that there is no premature lift-off or peel-back of the remaining maskant before chemical milling as pointed out by Gnanamuthu.

Response to Amendment

Applicant's request for reconsideration of the finality of the rejections in the last Office action mailed on 22 October 2003 is persuasive and, therefore, the finality of that action is withdrawn.

Response to Arguments

Applicant's arguments on pages 11-12 of the amendment filed 17 December 2003 requesting reconsideration of the finality of the previous Office action mailed on 22 October 2003 have been fully considered and are persuasive. Therefore, the finality of that action has been withdrawn.

However, applicant's arguments regarding the previous rejections of instant claims 1-49 have also been fully considered, but they are not deemed persuasive. The previous rejections over the art of record are now maintained in this Office action, which is made FINAL.

As stated above, Sokol and Maeda were combined because they both relate to the same art of radiation curable acrylate coating compositions. On page 14 of the amendment, applicant takes the position that Maeda is not in the art of radiation curing and contends, for this reason, that Sokol is not properly combinable therewith. However, Maeda teaches use of a polymerizable acrylate peelable maskant composition having either an inorganic or an organic polymerization initiator (column 4, lines 9-16), which can also include a cross-linking type

acrylate thickener (column 5, lines 64-66). Thus, Maeda clearly shows the suitability of using a curable acrylate coating composition as a peelable maskant suitable to withstand the subsequent etching of an underlying metal substrate. Maeda also teaches the heating or curing of this acrylate coating composition (e.g., by far infrared (IR) radiation, etc.) *after it has been deposited* (column 7, lines 44-46), as was previously pointed out. Even though the Maeda polymerizable acrylate coating composition was cured by heat and/or IR (rather than by actinic (UV) radiation, as in the instant case), the Maeda acrylate coating composition is still *radiation curable*, in order to form a suitably peelable maskant that stands up to subsequent etching of a metal substrate. In fact, the applicant admits on page 14 (1) that both Maeda and Sokol share the same intention to overcome the disadvantages of solvent emission that cause pollution found in the prior art coating compositions (even though each solves these common problems by different methods of preparing the acrylate coating compositions) and (2) that the Sokol substantially solvent free radiation curable acrylate coating composition is suitable for use on a metal substrate.

Therefore, Maeda and Sokol are still believed to relate to the same art of radiation curable acrylate coating compositions. The Sokol substantially solvent free radiation curable acrylate coating composition having a combination of polymerizable acrylate monomers and photoinitiators is quickly cured by actinic or UV light. This gives one of ordinary skill in the art motivation to substitute a solvent free radiation curable acrylate coating composition, as shown by Sokol, for the radiation curable acrylate coating composition of Maeda. Such a solvent free radiation curable acrylate coating, as shown by Sokol, would be expected to yield a peelable maskant functional in the process of Maeda.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Ruggles whose telephone number is 571-272-1390. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

John Ruggles
Examiner
Art Unit 1756

MARK F. HUFF
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